



National Transportation Safety Board

Amtrak Train Collision with Maintenance-of-Way Equipment

Chester, Pennsylvania

April 3, 2016

DCA16FR007

Ryan Frigo, Investigator-in-Charge











National Transportation Safety Board

AMTRAK Train Collision with Maintenance-of-Way Equipment

Chester, Pennsylvania
April 3, 2016

Investigative Team

- Ryan Frigo - IIC, Operations
- Joe Gordon - Track and Engineering
- Dana Sanzo - Survival Factors
- Dr. Michael Hoepf - Organizational Factors
- Dr. Steve Jenner - Human Performance
- Dr. Nick Webster - Medical Officer
- Ricky Page - Signals and Train Control
- Jim Southworth - Mechanical
- Charles Cates - Event recorders, recorded radio, and telephone
- Sean Payne - Inward- and outward-facing cameras
- Bill Tuccio - Portable electronic devices
- Joe Gregor - Handheld radios

Support Staff

- Sean Dalton - General Counsel
- Alice Park - Video editing
- Terry Williams - Media Relations
- Elias Kontanis - TDA
- Dr. Bob Beaton - Division Chief
- Dave Bucher - Division Chief
- John Whitener - CIO
- Christy Spangler - Graphic developer
- Meg Athey - Writer/Editor
- Rachael Gunaratnam - Visuals and timing
- Patrick Cahalane - Department of Energy, National Nuclear Security Administration

Parties to the Investigation

- Federal Railroad Administration
- Amtrak
- Brotherhood of Locomotive Engineers and Trainmen
- Sheet Metal, Air, Rail, and Transportation Workers
- Brotherhood of Maintenance of Way Employees Division
- American Railway and Airways Supervisors Association

Safety Issues

- Maintenance of Way Worker Protection and Foreman Transfer
- Positive Train Control
- Dispatching
- Employee Drug Use
- Organizational Culture





National Transportation Safety Board

Amtrak Train Collision with Maintenance-of-Way Equipment

Chester, Pennsylvania

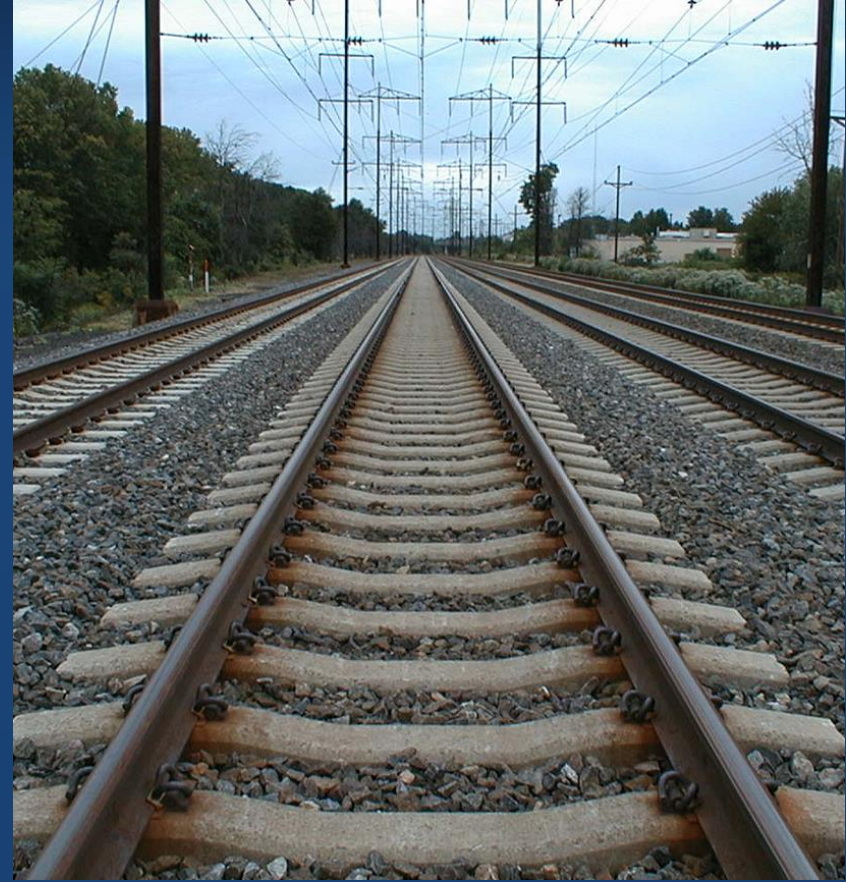
April 3, 2016

DCA16FR007

Roadway Worker Protection

Joe Gordon

Controlled Tracks



Roadway Worker Protection

- On-Track Safety (OTS)
- Working Limits on Controlled Tracks
 - Exclusive Track Occupancy
 - Foul Time

OTS Job Briefing

Required OTS Job Briefings must cover the following:

- Type
- Limits
- Protection on adjacent tracks (if required)

Control Point
Hook

Control Point
Baldwin

Track 4

Track 3

Backhoe

Track 2

Rail Vac

Track 1

← South

Not to Scale

Control Point
Hook

Control Point
Baldwin

Track 4

Track 3

Track 2

Track 1

Backhoe

Train 89

Rail Vac

← South

Not to Scale

Foul Time and Supplemental Safety Devices (SSD's)



On-Track Safety Issues

Night foreman released foul time	Foremen did not have SSDs	No employee challenged	Inadequate sight distance for use of TAW
Day foreman did not get foul time	Supervisor did not ensure SSDs	Job briefing denied upon request	No Slow-By through construction zone
Inefficient foul time procedures	No SSD efficiency testing code	Incorrect information was relayed	PTC system does not provide protection when SSDs are not used
SSDs were not used	Job briefing not held	Supervisory safety role unfulfilled	No SSWP was prepared
Dispatcher did not ensure SSDs were used	Job briefing circulated while track was occupied	Inadequate number of watchmen	Cell phones used, not radios

Amtrak Post-Accident Actions

- Clarified and reiterated protocols for:
 - Fouling tracks
 - Proper use of SSDs
 - Procedures for communicating mandatory directives
 - OTS procedures for large production gangs
- Provided employees with Post Incident Action Update
- Enhanced its dispatch system to provide redundant protection for fouling activities

FRA Post-Accident Actions

- Redundant protection for roadway workers on signaled territory
- Focused inspection on the Amtrak Northeast Corridor
- Efficiency testing program with Amtrak
- Random drug screenings for maintenance of way employees





National Transportation Safety Board

Amtrak Train Collision with Maintenance-of-Way Equipment

Chester, Pennsylvania

April 3, 2016

DCA16FR007

Positive Train Control

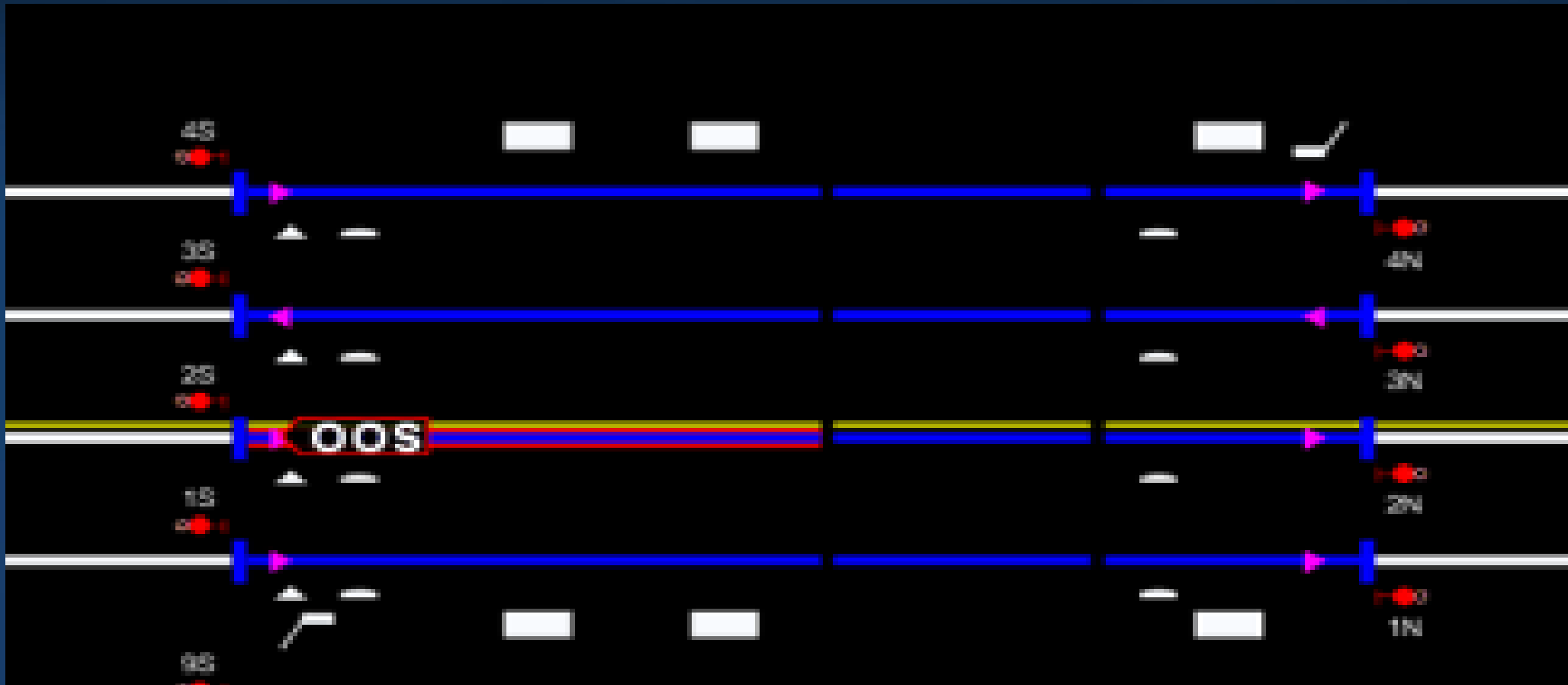
Ricky Page

FRA Requirements for PTC

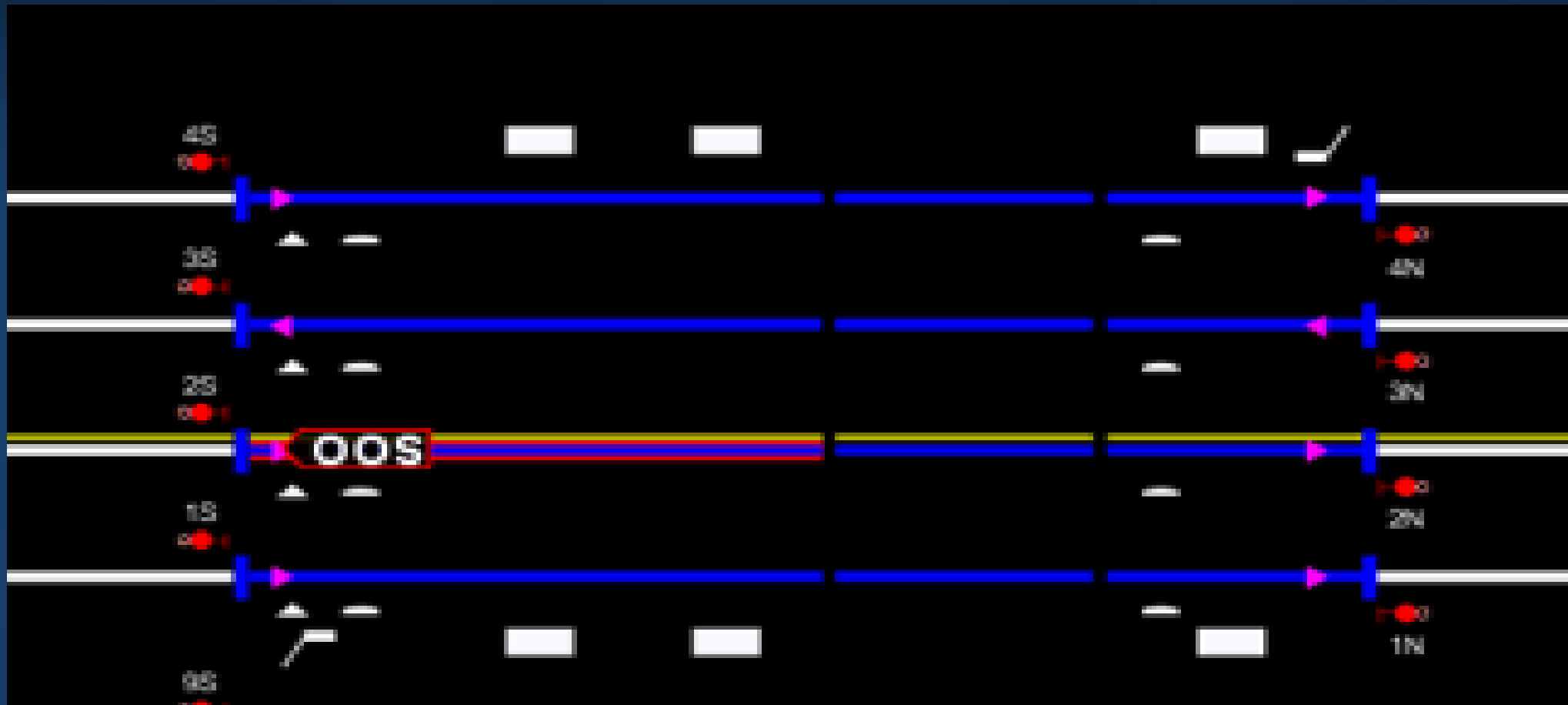
Prevent:

- Train-to-train collisions
- Overspeed derailments
- Incursions into work zones
- Movements through misaligned switches

Electronic Blocking



Track Occupancy Light



Released Foul Time



Clear Signal



Human Intervention and PTC

- Work zone was released
 - Release of foul time
 - Removal of protective blocking
- Failure to use or verify use of SSDs

Safety Recommendation to FRA

Require redundant signal protection, such as shunting, for maintenance-of-way work crews who depend on the train dispatcher to provide signal protection. (R-08-06)





National Transportation Safety Board

Amtrak Train Collision with Maintenance-of-Way Equipment

Chester, Pennsylvania

April 3, 2016

DCA16FR007

Safety Culture

Mike Hoepf, Ph.D.

Weak Safety Culture

- On-Track Safety Issues
- Drug Use
- Dispatching
- First-Line Safety Oversight
- Reporting Systems
- Corporate Safety Knowledge and Vision

Weak Safety Culture

- Active failures - in direct contact with system
- Latent conditions - system designers, managers
- Numerous signs of Amtrak's weak safety culture
 - Poor training
 - Lack of safety equipment

On-Track Safety Issues

Night foreman released foul time	Foremen did not have SSDs	No employee challenged	Inadequate sight distance for use of TAW
Day foreman did not get foul time	Supervisor did not ensure SSDs	Job briefing denied upon request	No Slow By through construction zone
Inefficient foul time procedures	No SSD efficiency testing code	Incorrect information was relayed	PTC system does not provide protection when SSDs are not used
SSDs were not used	Job briefing not held	Supervisory safety role unfulfilled	No SSWP was prepared
Dispatcher did not ensure SSDs were used	Job briefing circulated while track was occupied	Inadequate number of watchmen	Cell phones used, not radios

Drug Use

- Three employees tested positive for potentially impairing drugs
- Presence of drugs indicates a failure to prioritize safety

Dispatching

- Did not ensure required roadway worker protections were used
- Did not confirm track 3 was clear
- Conducted personal phone calls

Dispatching

- “Every second that a train is delayed, we got the clerks [and] the manager of train operations calling saying, ‘what happened to train so and so?’ ”
- Rules and supervisor expectations did not emphasize safety



First-Line Safety Oversight


- Safe-2-Safer Program
- Confidential Close Call Reporting System (C³RS)
- Safety Liaisons Program

First-Line Safety Oversight

- Union reaction to Safe-2-Safer:
 - “...nothing but a program that drove down safety statistics...”
 - “...nobody believed in the program, but if you spoke against [it], especially managers, they were deathly afraid to say anything because their superiors would take action against them...”
 - “This company is driven by fear.”
- Unions opted out of Safe-2-Safer and C³RS
- No safety liaison present, and program not fully implemented

Reporting Systems

- Violation led to job termination
- Enforcement incompatible with safety culture
- Unintended consequence -- employees afraid to report
- No viable reporting system



10 Cardinal Rules

The following actions constitute serious violations of Amtrak's Operating Rules and Standards of Practices that put life and limb at risk. Violations of these rules will be handled with zero tolerance. Discipline for any such violations will likely lead to immediate dismissal.

1. Any unauthorized tampering with or disabling of an approved safety device.
2. Any serious failure to comply with applicable Lock Out/Tag Out procedures and AMT-2 Electrical Operation System procedures.
3. Any serious failure to comply with confined space entry requirements for all permit required confined spaces.
4. Any unauthorized use of an electronic device when operating or riding moving equipment; directing equipment movement; assisting in preparing equipment for movement; and performing service on the ground, in yards, or on main track.
5. Falsification of inspection or maintenance documents.
6. Cheating on required exams.
7. Working on, under, between rolling equipment without proper Blue Signal Protection procedures.
8. Failure to comply with Shoving and Backing Movements procedures.
9. Failure to comply with approved Fall Protection Equipment procedures where required.
10. Failure to comply with applicable Roadway Worker Protection (RWP) Procedures.

All alleged violations shall be immediately and thoroughly investigated. Findings demonstrating violations of these rules shall warrant severe discipline, likely dismissal. Should extenuating circumstances arise that warrant variation in discipline, they will be reviewed, and discipline shall be approved by the Cardinal Rules Review Board consisting of our Chief Transportation Officer, equivalent officers as necessary, and Labor Relations as necessary.

Corporate Safety Knowledge and Vision

- Inconsistent vision of safety among leadership
- Some managers knowledgeable of system safety principles
- Most relied only on “Follow the Rules”

Post-Accident Actions

Federal Railroad Administration

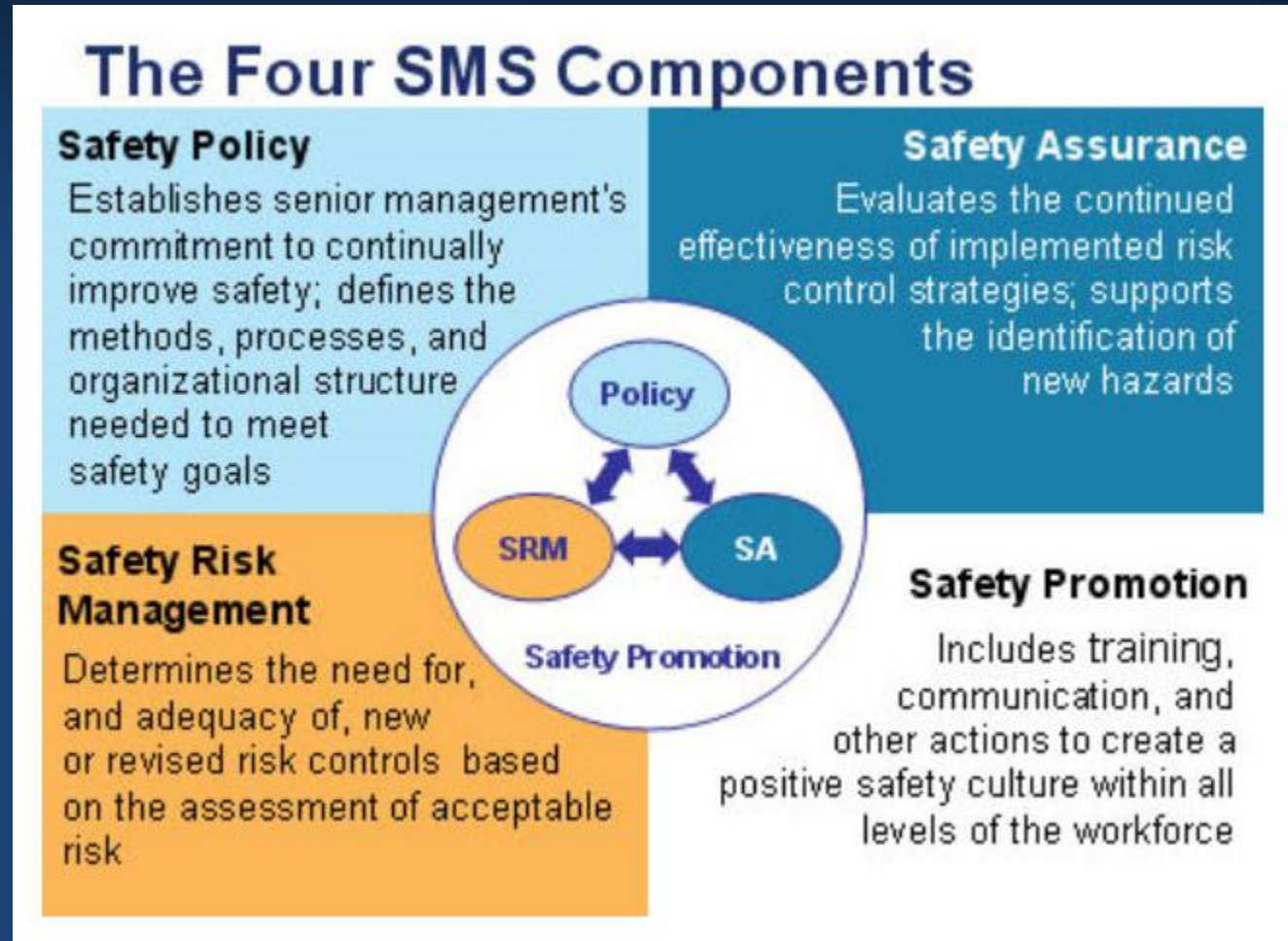
- Amended Control of Alcohol and Drug Use rule requiring random drug screening for maintenance-of-way employees

Amtrak

- Safety stand-down, rules alerts, and procedure changes
- Independent compliance group and efficiency testing
- Revised drug and alcohol policy
- Pursuing improved technology

Safety Management System (SMS)

Amtrak's senior leadership must energize their safety culture with a systemic solution



Federal Railroad Administration

System Safety Program regulation - 49 *CFR* Part 270

- Written and finalized, but not enacted
- Stayed four times in 2017
- Delaying progressive system safety regulation

